

## SECTION 23 65 00

### CLOSED CIRCUIT COOLERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes factory assembled and tested, closed circuit mechanical forced-draft vertical discharge closed circuit cooler.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.
- B. Shop Drawings: Complete set of manufacturer's prints of evaporative equipment assemblies, control panels, sections and elevations, and unit isolation. Include the following:
  - 1. Assembled unit dimensions.
  - 2. Weight and load distribution.
  - 3. Required clearances for maintenance and operation.
  - 4. Sizes and locations of piping and wiring connections.
  - 5. Wiring Diagrams: For power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.
- C. Operation and Maintenance Data: Each unit to include, operation, and maintenance manual.

##### 1.4 QUALITY ASSURANCE

- A. Verification of Performance:
  - 1. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by a Certified CTI Thermal Testing Agency. The Evaporative Heat Rejection Equipment shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.
  - 2. Unit Sound Performance ratings shall be tested according to CTI ATC-128 standard. Sound ratings shall not exceed specified ratings.
- B. Unit shall meet or exceed energy efficiency per ASHRAE 90.1

##### 1.5 WARRANTY

- A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.
  - 1. Fan Motor/Drive System: Warranty Period shall be Five (5) years from date of unit shipment from Factory (fan motor(s), fan(s), bearings, mechanical support, sheaves, bushings and belt(s)).
  - 2. The Entire Unit shall have a comprehensive one (1) year warranty against defects in materials and workmanship from startup, not to exceed eighteen (18) months from shipment of the unit.
  - 3. Heat Transfer Coil: Warranty Period shall be One (1) year from date of unit shipment from Factory.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide closed circuit coolers manufactured by one of the following:

1. EVAPCO Model \_\_\_\_\_

2. Approved Substitute

## 2.2 THERMAL PERFORMANCE

A. Each unit shall be capable to cool \_\_\_\_\_ GPM of water entering at \_\_\_\_\_ ° F leaving at \_\_\_\_\_ ° F at a design wet bulb of \_\_\_\_\_ ° F with a pressure drop across the coil not to exceed \_\_\_\_\_ psi.

## 2.3 IBC COMPLIANCE

A. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) for: LP = \_\_\_\_, SDS = \_\_\_\_, P = \_\_\_\_ psf.

## 2.4 COMPONENTS

A. Description: Factory assembled and tested, forced draft counter flow closed circuit cooler.

B. Materials of Construction

1. All panels including the fan snouts, housings and supports shall be constructed of hot-dip galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.

C. Fan(s):  
1. Fans shall be forward curved centrifugal of hot dipped galvanized construction. The fans shall be factory installed, and statically and dynamically balanced for vibration free operation

D. Fan Housing

1. The complete drive system, including the electric motor, belts, bearings, fan, and drives shall be completely enclosed in a protective housing which covers the drive system and provides sound reduction.

E. Drift Eliminators

1. Drift eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate.

F. Water Distribution System

1. Spray nozzles shall be precision molded ABS with large orifice threaded into branch piping with internal sludge ring to eliminate clogging. Spray header and branches shall be schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance.

G. Heat Transfer Media

1. Heat transfer coil shall be elliptical tubes of prime surface steel, encased in steel framework with entire assembly hot-dip galvanized after fabrication. The coil assembly shall be designed with sloping tubes for liquid drainage. Coil shall have design pressure of 300 psi and shall be in compliance with ANSI/ASME B31.5, Refrigeration Piping and Heat Transfer Components. The coil assembly shall be strength tested in accordance with ANSI/ASME B31.5 and subsequently leak tested using air under water."

H. Pump

1. Unit shall have EISA close-coupled centrifugal pump with mechanical seal. The pump shall be installed in a vertical position so that water will drain from the pump when the cold water basin is emptied. Pump motor shall be totally enclosed with protective canopy for outdoor operation.

I. Bleed-off  
1. Unit shall have a waste water bleed line with a manual adjustable valve provided.

J. Air Inlet Screens

1. Protective screens shall be provided over air inlet

K. Make up Float Valve Assembly

1. Make up float assembly shall be a mechanical brass valve with an adjustable plastic float.

L. Pan Strainer

1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.

## 2.5 MOTORS AND DRIVES

A. General requirements for motors are specified in Division 23 Section "Motors"

B. Fan Motor

1. Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.

C. Fan Drive

1. The fan drive shall be V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Belt adjustment shall be accomplished from the exterior of the unit.

D. Fan Shaft

1. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.

E. Fan Shaft Bearings

1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on exterior of unit.

2.6 MAINTENANCE ACCESS

A. Fan Section

1. Fan screens shall be removable for fan motor and drive access at grade.

B. Basin Section

1. Circular access door shall be located above the basin to allow for easy access to pan interior